Africa Development, Vol. XXIII, No. 2, 1998

Food Policy: Managing Drought and the Environment in Botswana

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Résumé: Le Botswana est un pays semi-aride, enclin à la sécheresse et enclavé. Il est aussi très pauvre en eau de surface et en potentiel agricole. Cependant, les perspectives sont excellentes pour ce qui est de sa production de viande bovine et de sa faune. Aussi, les politiques sociales relatives à l'agriculture et à la production alimentaire doivent-elles prendre en charge les besoins et aspirations du pays en tenant compte des contraintes naturelles et en faisant bonne mesure des préoccupations environnementales, socio-économiques et politiques conflictuelles. Souvent, l'homme, le cheptel et la faune, se disputent les maigres ressources disponibles. Le présent article examine donc la manière dont l'environnement au Botswana influe sur les politiques sociales, en s'attardant sur les politiques alimentaires et programmes connexes. Il lie la politique alimentaire aux phénomènes environnementaux, comme la sécheresse, qui la façonnent.

Introduction

Analysing environmental issues in the context of social policy involves an understanding of the relationships and interactions between humans and their physical environment, and the social and economic processes which give rise to a particular environmental issue. This is in view of the fact that populations create their own impact on the environment, and that the environment in turn impacts on societal conditions and life processes. Thus, human conditions result from the interplay of social, economic, political and physical environmental factors as part of the human processes of organising a living, involving both economic and social production, and consumption (Osei-Hwedie 1995; Bowlby and Mannion 1992). The environment is crucial 'as a source of natural resources (raw materials, energy); and use as a source of service (Life-support, creation, beauty)...' (Bojo and Unemo 1990:19).

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The main issue, perhaps, is how to balance competing interests in the policy arena when dealing with environmental problems. In this context the economic and political frameworks for decision making are key to understanding why certain environmental decisions are recognized and addressed in a particular way. Other environmental issues in the context of social policy relate to sustainability. This is because social policy has to address the consequences of resource exploitation in view of environmental impact on socio-economic changes; the capacity of the environment to cope with meeting human needs and associated consequences; and the need to manage the impact of socio-economic growth on environmental processes. It is necessary for policy to emphasize the maintenance of ecological processes, the sustainable use of resources, and the maintenance of genetic diversity (Soussan 1992:24).

Policy must reconcile societal needs and aspirations with the limitations of the natural world. The major challenges, in this sense, revolve around food production, raising enough yields in a manner less damaging to the environment, and using processes that will guarantee continuous adequate production; urbanisation, due to the fact that increasing urbanisation brings with it formidable problems associated with social and institutional changes and investments in infrastructure; and human encroachment, in the sense that with increasing population the scale of human activities as well as the pressures on fragile ecosystems also increase (Serageldin 1993). Since sustainability is socially constructed, it is impacted upon by social organisation and institutional arrangements, cultural processes, and interpersonal relationships in an environmental context (Osei-Hwedie 1995). This paper, therefore, discusses how the environment has shaped social policy in Botswana. More specifically, it relates food policy to the environmental processes and programmes which shape it.

The Policy Environment

Botswana is a landlocked country, bounded by South Africa, Namibia, Zambia and Zimbabwe. It is relatively a large country with an area of 582.000 sq km. Botswana has an arid and semi-arid climate with an annual rainfall ranging from over 610 mm in the extreme north-east to less than 250 mm in the extreme south-west. The rainfall is highly erratic and

unevenly distributed. Most of the rain (about 90 per cent) is in the summer months between April and November. Temperatures are high and vary between 22°C and 33°C from July to January. Consequently, evaporation rates are high, ranging from 6 mm to 12 mm daily (CSO 1986). Related to this, there is very little surface water and rivers flow only after intensive rain (except in the extreme north-west). The Okavango and the Chobe drainage systems are the only major permanent surface water. It must be noted that much of the country's surface land, over 66 per cent, is covered by either the Kalahari sand or the Kalahari desert (Government of Botswana 1991).

Most of the country has shrub and savannah vegetation. Only 5 per cent of the surface area has adequate rainfall and suitable soils and the potential for arable agriculture. However, even in that area the variability of rainfall, combined with high evapo-transpiration rates, lead to a high risk of crop failure. The climate also has an impact on rangeland. The low rainfall and poor soils result in grasses of poor quality and productivity, particularly in the desert area (Government of Botswana 1991). Botswana is a drought-prone country. According to Duncan *et al.* (1994), the government declared 1968-70, 1974-75, 1979-80, 1981-87, and 1990-93 drought years. Each drought has adverse effects on household income due to loss of agricultural production and employment as well as loss of assets such as livestock. Therefore, drought has serious implications for the economy, and presents a distinct risk to agriculture. This, in turn, affects the food security profile of the country, especially at the household level where many people cannot afford to buy imported food.

Much of the land area is suitable for beef production, and this is underlined by the fact that there is more cattle (estimated at 4 million) than people. The development of boreholes has made it possible to establish ranches in more fragile range land and areas such as the Kgalagadi in the west. Livestock agriculture, game and humans often present competing interests in the uses of fragile marginal lands. Hence, a careful balancing is required so that the land is used to its best advantage and potential (Government of Botswana 1991). Wildlife resources are concentrated in national parks and game reserves which occupy about 17 per cent of the country.

Botswana's population, according to the 1991 census, is 1,327 million, having grown from 550,000 in 1966. The average annual rate of increase was 3.7 per cent between 1966 and 1981. Between 1981 and 1991, the annual rate of growth declined slightly to 3.5 per cent. These figures imply that the population has almost tripled in a period of 27 years. This also partly points to the high fertility rate which stood at 5.3 in 1991, having declined from 7.1 in 1981 (Duncan *et al.* 1994). Despite the apparently small population size and low population densities in Botswana, the population growth of 3.5 per cent is significant in terms of the decline in real GDP growth. The World Bank (1989) has projected that left unchecked, Botswana's high dependency ratio will exact negative effects on capital investment and savings and, ultimately, food security. Another important demographic factor is migration from rural to urban areas. Duncan *et al.* (1994) again point to the fact that Botswana's population has moved from villages to the most prosperous urban areas along the line of rail and from small villages to larger villages. Thus, whereas in 1964, 4 per cent of the population lived in urban areas, by 1991, 24 per cent were in towns and 20 per cent in the big villages that have relatively more urban characteristics.

When Botswana obtained its political independence from Britain in 1966, it was among the world's twenty poorest countries in per capita terms. Its main source of income was cattle, subsistence agriculture and remittances of workers who migrated to South Africa (Hoppers 1986). What has been remarkable about Botswana is its dramatic rate of economic growth and its adherence to democratic principles since independence. Botswana's economic growth was the highest for any country in the world from 1966 to 1986. From 1968 to 1978, GDP grew three times in real terms (Hoppers 1986). In 1987, GDP at current market prices was about P2.5 billion and this represented an eight fold increase over the previous decade (Duncan *et al.* 1994). All sectors have experienced tremendous growth. However, the importance of agriculture has decreased because of drought and the tremendous leap in mining.

The Botswana economy is based mainly on export-driven diamond mining and cattle sectors. Diamond production helped to increase revenues from P 394 million in 1982-83 to P 4,161 million in 1992-93. Expenditure increased by 25.6 per cent during the same period. Major spending has

been on social services such as education and health, and on infrastructure such as roads, electricity and water. For example, by 1991, 83 per cent of females and 79 per cent of males aged 15-49 were enrolled in formal education. Also, about 83 per cent of children of primary school age, 7-13-year-olds were enrolled in formal education. Road construction led to remarkable access to rural areas, and at the end of 1990, about 32 per cent of all public roads were tarred (Fako and Molamu 1995).

On the whole, the poor have not benefited from the improved economic performance. For example, a decade ago, about 60 per cent of the people in rural areas did not own cattle (CSO 1986). This was an increase from the 45 per cent estimated by the 1981 census. In 1974, 45 per cent of rural households had incomes below the poverty datum line (PDL). In 1980, 54.5 per cent of the people in small villages and 46.5 per cent in large villages were below the PDL. In both areas, those in absolute poverty had incomes estimated to be about 44 per cent below the PDL (Fako and Molamu 1995). Several assistance schemes have been instituted to improve productivity, especially in agriculture. These include the Financial Assistance Programme (FAP), Small Projects (AEIO), Service to Livestock Owners in Communal Areas (SLOCA) and Local Government (LG17). Despite all these, however, the agriculture sector grew only at a rate of 3.4 per cent during 1985-89 period, lower than the 3.6 per cent population growth rate per annum (Fako and Molamu 1995).

The overall impact of drought indicates that rural peasants become progressively impoverished during drought years and are unable to feed themselves in non-drought years. Botswana has put structures in place to respond to drought quickly and effectively through the Inter-Ministerial Drought Committee, the Department of Food Resources, the District Drought Committees and the District and Village Extension Teams. Through these and other structures, programmes have been devised to assist the most vulnerable categories of people due to endemic drought, persistent food deficits, low incomes and lack of employment (Fako and Molamu 1995). The consequences of persistent drought including shortages of food and deficient nutrition, prompted the development of the National Food Strategy (NFS) as a major element of the Rural Development Policy (Government of Botswana 1985; Fako and Molamu 1995). The NFS has to deal with nutrition, drought preparedness, food

storage, different food production systems and drought relief and recovery programmes (Fako and Molamu 1995).

The Status of Women

Any discussion of the relationship between social policy and the environment will bc incomplete if it does not touch on the status and role of women in production. The problems of development in Botswana are partly related to the fact that the position of women in society has not improved very much over the years (Osei-Hwedie, Mufune and Mwansa 1996). Women are restricted in the acquisition of land, cattle and credit. Furthermore, married women have limited rights to speak for, and take full guardianship of their children; seek loans and credit facilities; and enter into contract or agreements without the explicit consent of their husbands. In addition, they cannot put up their property as collateral without the consent of their husbands. This is because women married under community of property are regarded as minors. It is also evident that culturally, women are expected to stay at home to care for children and carry out domestic chores. Men, on the other hand, are expected to go out to earn a living and take care of the women and children, and make all decisions (Granberg and Parkinson 1988).

Available evidence points to the fact that about 48 per cent of all Botswana rural households and 45 per cent of all households are headed by women (World Bank 1989). Nearly 40 per cent of women and 25 per cent of men, respectively were rounded by the 1985-86 Households Incomes and Expenditure Survey (HIES) to earn less than 100 pula per month. The proportion of women earning P 300 per month in cash and in kind was much lower than for men. In terms of productive assets, female-headed households own only 12 per cent of cattle on traditional farms while an overwhelming 62 per cent of female-headed households owned no cattle at all (Duncan *et al.* 1994). It is also noted by Duncan *et al.* (1994), that rural women, and especially female-headed households, are significantly more affected by problems associated with lower social status, heavy workloads and high dependency ratio. In the public sector, women have not fared well also. For example, in 1991, they occupied only one-third of all public sector jobs. Given that female-headed households account for almost 50 per cent of all households, this low share of public

sector employment may partly explain why female-headed households have limited access to resources. In addition to this, women mainly find employment in domestic service, retail, education, and manufacturing which are usually of low status and play (Duncan *et al.* 1994).

Social Policy and Environment

Poverty reduction is central to conserving the environment. Duncan *et al.* (1994) indicate the causes of poverty in Botswana as harsh climatic conditions, which lead to low and variable agriculture production; lack of employment opportunities; lack of skills; and limited access to such productive assets as cattle, draft power, water, arable land, labour and credit. These have been exacerbated by high population growth and a rapidly degrading environment. Duncan *et al.* (1994), also argue that income distribution is highly skewed in Botswana. Most people's incomes are below US$2,590, which is the per capita income figure of the country. Granberg and Parkinson (1988) agree with this picture by arguing that the gini coefficient for Botswana was 0.52 in 1974 and 0.73 in 1987. The 1985-86 Household Income and cm Expenditure Survey (HIES) round that 50 per cent of rural households were living below the Poverty Datum Line (PDL). Forty per cent of households earned only 11 per cent of the total cash and in kind income; the middle 40 per cent earned 28 per cent of the total income; while 20 per cent earned 61 per cent of the total income. Rural and female-headed households fared even worse (Duncan *et al.* 1994).

Lack of ownership of livestock is an indicator of poverty in Botswana. The distribution of cattle ownership is also highly skewed. Available data indicate that 40 per cent of the population do not own cattle and that most people who own cattle have small numbers. Ten per cent of farming households own about 60 per cent of the cattle in the country. Those without cattle in rural areas have to hire cattle for draft power. This has several implications. They can only cultivate limited areas due to the high cost of hiring cattle; and many receive draft power late, leading to late planting and crop failure. Indicators show that more people are being driven from traditional agriculture to urban areas in search of employment. Duncan *et al.* (1994) estimate that the number of people engaged in traditional agriculture fell from 121,000 in 1984 to 68,000 in 1991,

tremendously lowering the capacity for food production. A report by UNDP, Government of Botswana and UNICEF (1993) maintains that despite the general improvement of the quality of life in Botswana, poverty is still a major social problem in that a quarter of the population below the PDL (or 10 per cent of all households in Botswana) relies heavily on government support.

The sector which is affected most by the environmental conditions is agriculture. According to Sigwele (1993), the cattle-dominated agricultural sector produces about 40 per cent of the country's GDP. By 1993, over 90 per cent of the population lived in rural areas with their livelihood based on agriculture. However, agricultural production is beset by persistent drought. The political economy has changed significantly. Now, the country relies on the mining sector through diamond mining which contributes about 40 per cent of the GDP. However, about 70 per cent of the 1.3 million people still rely on agriculture. Up to 1991, major agricultural policy objectives sought to improve and secure the livelihood of those depending on it, increase food self-sufficiency, conserve agricultural resources and create more job opportunities for the fast expanding labour force (Sigwele 1993).

Sigwele (1993:284) sums up vividly the dilemma that faces the government if water were to be available:

> Available data indicate that to irrigate a hectare of maize, about 1,700 cubic metres (m^3) of water are required. With this amount of water, say in the rural areas, about 2,400 may benefit per year. For the livestock subsector on the one hand about 1,500 cattle could be watered, while approximately 1,400 carats of diamonds can be produced using this water. Clearly, the technical, political and economic considerations of how a scarce resource such as water should be allocated in Botswana are just as sensitive as conserving and utilising fuel (petrol/diesel).

Through the food self-sufficiency policy, financial assistance schemes were implemented to subsidise inputs and producer prices. Farmers were encouraged to focus on few commodities, especially sorghum and maize. The noble objectives of social justice and equity were compromised since the major beneficiaries have been large scale farmers.

The food self-sufficiency policy has had some serious effects on the environment. Sigwele (1991) indicates that through the grants given,

farmers destumped and cultivated marginal lands as well as lands that are not normally ploughed due to their low yields. The problems associated with arable agriculture and food production, led to the adoption of a new food policy based on the notion of food security which does not only recognise the limitations of the physical environment on food production, but also underscores the strategic role of income in acquiring food for a healthy and productive life (Sigwele 1993). The food security policy is to improve and diversify income sources, especially of rural areas, to enable people to acquire food. In addition, it encourages sustainable domestic, as well as competitive production together with contingency plans for food availability. Thus, it facilitates production where factors are favourable (Sigwele 1994). Somolekae (1994) notes that Botswana needs, and is constantly struggling to design public policies that uphold a balancing act among conflicting environmental, socio-economic and political concerns.

This has been possible due to substantial mining revenues and international aid. Prolonged and persistent periods of drought have forced the government to protect the poorer segments of society through a combination of basic needs satisfaction and emphasis on traditional welfare mechanism to some extent. Low rainfall, persistent drought, and rapid population growth have led to an increasing need for food imports. For example, cereal imports rose from 21,000 metric tons in 1974 to 141,000 tons in 1988, a drought year. During the same period, food aid rose from 5,000 tons to 49,000 tons (Yeager 1989).

The Batswana, in general, have adapted to their environment. For example, traditional Tswana societies were kinship-based and the communities were divided into wards governed by chiefs and headmen who shared power with village and ward councils or *Dikgotla*. Apart from resolving disputes and dealing with matters of collective interest, from an environmental point of view, they advised chiefs on issues related to land and water in the maintenance of pastoral and arable agriculture. They also evolved a process called *Mafisa* whereby those with many herds of cattle routinely loaned some to those with few. This ensured draft animal power, milk and meat, and basically protected the grazing environment through the process of spreading out the cattle. In addition, life was shared among the different homesteads through the movement from the villages to the

farming land for planting and then to the cattle posts during the dry season for herding (Yeager 1989).

British colonial administration brought a partial commercialisation of the cattle culture. The process has almost been completed by the post-independence government, and has resulted in the shifting of power from those with vested interest in conservation to those much interested in livestock commercialisation. The land tenure system, among other things, tries to satisfy the requirements of a pastoral society increasingly becoming commercialised. The tenure includes state land, consisting of wildlife refugees; communal or tribal land under collective ownership and land-use arrangements, especially in rural communities, freehold farms, and lease ranches carved out of lands previously held under communal arrangements. The demands of people, cattle and wildlife, create situations of ecological dislocations. There is often competition between humans, wildlife and cattle. This is especially aggravated by the expanding cattle population (Yeager 1989).

The government of Botswana is committed to the idea of natural resource conservation and sustainable development. This is reflected by the adoption of the National Resource Conservation and Development Policy. Environmental policy has revolved around issues including pressure on water resources (due to increasing human and livestock population), range land degradation (due to extensive use and related management problems), depletion of wood resources (due to uncontrolled harvesting), over-use and exploitation of veld-products, general pollution of air, water, soil and vegetation resources, and overall management of drought and related issues (Muntanyatta 1995; Government of Botswana 1990).

However, Selolwane (1995) indicates that the interactions among human actors and with their environment produce beneficiaries and losers. In the case of Botswana, she argues that development policies have enabled big cattle ranchers to put their short-term interest for profit before that of the welfare of the poor and the judicious exploitation of the environment. Selolwane (1995:91) points out again that land degradation is politically sensitive, since 'it most directly touches the main livelihood activity of politically powerful Botswana elite'. Thus, policy tends to protect their interest to the disadvantage of the poorer segments of society.

In view of this, Botswana's policy has been described as one that focuses on the protection of the short-term interests of the powerful to the neglect of environmental conservation and safeguarding the incomes of the disadvantaged (Selolwane 1995).

Some observers contend that agricultural privatisation has contributed significantly to rural impoverishment and environmental degradation (Yeager 1989; Selolwane 1995). For example, with respect to range land, Selolwane (1995) indicates that the fencing strategy was carried out despite the many reservations, including: The possibility of enclosure depriving small holders, non-cattle owners, and various other disadvantage groups (e.g., ethnic minorities) of access to land and livelihood; the negative impact of fencing on the environment. For example, the potential to compromise the resilient characteristic of the ecosystem which enables rapid recovery after drought; the likelihood of the continuation of inefficient production regimes when institutions meant to maintain efficient stocking rates fail to do so; and the continued over-emphasis on pastoral production over other economic activities, and hence the possibility of eroding the resource base for arable agriculture and other land base income sources such as veld-products and game. Selolwane (1995) contends further that conservation of the environment is not among the key issues considered for fencing and agricultural development.

Food Security Policy and Responses to Environmental Conditions

It is important to distinguish between food security and food self-sufficiency, particularly in the context of Botswana where the government makes a clear distinction between the two concepts. Food security relates to measures and/or precautions taken to ensure adequate availability of food. This is important because it protects the population against famine and malnutrition. Food security is conceptualised at various levels. At the national level, 'food security means access by the country at all times to food suppliers to meet national demand adequately' (UNDP, Government of Botswana and UNICEF 1993:99). The main determinants of food security at this level include the amount of food produced in the country, the reserves of food a country has, commodity trade, the international economic order, and the politics of the country. Country specific factors such as drought are also important (Government of Botswana and

UNICEF 1993:99). Food security as conceptualised at the level of household food security refers to:

> Access to enough food for a normal healthy life – in quality and quantity and culturally acceptable type – for all members of the household throughout the year. Of critical importance is the ability of the households to (independently) buy the food that is available in the market (UNDP, Government of Botswana and UNICEF 1993:100).

On the other hand, food self-sufficiency implies a situation whereby a country is able to provide its own food requirements to adequately support its population. A country which aims at food self-sufficiency is one which systematically reduces dependence on foreign sources of food by increasing production of food crops and livestock at both household and commercial levels. According to Sigwele (1993), food self-sufficiency is a strategy aimed at producing basic staples such as sorghum and maize to satisfy the country's needs without taking into account the suitability of soils and climates, level of consumption and cost. It is an import substitution strategy in the food sector.

Policies Towards Food Security

The Policy of National Food Self-Sufficiency

The policy framework for food security in Botswana has been predicated on:

a) The National Food Strategy (NFS) of 1985;

b) The New Agricultural Policy (NPA) of 1991;

c) The National Policy for Rural Development of 1973 and the Revised National Policy on Incomes, Employment, Prices and Profit of 1990.

Additionally, the National Development Plans (NDP 6 and NDP 7) contain important statements on food security. The initial policy adopted by the Botswana Government was concerned with reducing the country's dependence on the importation of food. This was to be done by raising crop production and resultant incomes from rural households. According to NDP 7, national food self-sufficiency:

> Implies production within Botswana sufficient livestock, sorghum, millet, maize and milled products of these grains to satisfy the food needs of everyone in Botswana, regardless of costs. Given the environmental constraints in Botswana, this cost would be very high. Furthermore, national food self-sufficiency is only indicative of the physical supply of food: it does not guarantee universal access to food, nor the end of hunger and malnutrition (Government of Botswana 1991:259).

Two policy statements are especially important here. These are the 1985 National Food Strategy and the National Development Plan of 1982 to 1990. The National Food Strategy of 1985 includes the following key elements:

a) Expanding food production through the mobilisation of small-scale peasant farmers and commercial farming;

b) Establishment of nutrition programmes such as the National Nutrition Surveillance System (NNSS) which introduced regular monitoring of the nutritional status of children;

c) Drought relief programmes.

The concern is with planning and implementation of relief programmes in the case of drought and with putting measures in place to achieve agricultural sustenance after drought.

d) The NFS provides for a Strategic Grain Reserve planned to store up to three months supply of food grains such as maize, sorghum and millet; and

e) Finally, mention is made of a data base concerning food. This is to provide early warnings in case of impending food shortage (Government of Botswana 1985).

The NFS aimed at addressing problems at two levels. At the level of the nation there was need to reduce reliance on a rapidly rising level of food imports. These imports were in the form of food which was commercially purchased and food from international aid. Additionally, the government was concerned about the lack of strategic food reserves to respond to food shortages, especially in drought situation. At the household level, there was need to reduce the large gap between food production and basic nutrition requirements (Government of Botswana 1985). Coupled with

limited incomes, these gaps led households to depend on government relief schemes. In concrete terms, the state launched various schemes to effect the NFS. To this end, it started work to identify 10 to 20,000 hectares of suitable land for irrigated crop production in Chobe and Ngamiland (Granberg and Parkinson 1988; NDP 6). The Pandamatenga scheme with an approximate area of 100 to 150,000 hectares was started from the production of cereals on a commercial basis. The Financial Assistance Programme (FAP) and the Agricultural Credit Guarantee (ACGS) were set up to give the National Development Bank (NDB) security on loans designed to cover the balance of financial requirements (Granberg and Parkinson 1988:27). The Arable Lands Development Programme (ALDEP) was designed to deal with food sufficiency problems at the household level.

From Food Self-Sufficiency to Food Security

With the National Development Plan 7 (1991-1997), the government decided to shift emphasis from food sufficiency to food security. According to NDP 7:

> Self-sufficiency made possible by high cost heavily subsidised production is not what government is seeking. Nor does the government desire self-sufficiency that does not address the needs of the rural population for employment (self-sufficiency achieved by exclusive reliance on large scale commercial production) (Government of Botswana 1991:258).

The shift from self-sufficiency to security occurred because of a number of factors. As Sigwele (1993) argues, the government recognised that national food self-sufficiency in cereals was neither possible nor desirable in financial terms. The possibility of increasing food production was severely limited by the country's physical environment and hot climate which combine to contribute to frequent drought conditions. According to Motsemme (1986), the highly capricious rainfall in the country has resulted in wide annual fluctuations in food grains production. The highest food grain production of 118,000 tons recorded in the 1975-76 season had fallen to a low of 7,000 tons by 1983-84. The per capita food production level fell from 159 kg per annum in 1975-76 to 58 kg per annum in 1980-81 to 7 kg in the drought year of 1983-84 (Motsemme 1986:145). This food production situation was against the background of population growth of about 3.6 per cent. Duncan *et al.* (1994) similarly, argue that

even in the years of good rainfall, Botswana is only able to produce less than half of its food needs. During the 1981-82 drought period, domestic food production fell to less than 10 per cent of Botswana's cereal requirement.

Given the foregoing, the policy of national food self-sufficiency did not reduce the country's dependency on food imports. What is more, the World Bank (1989) projected that food importation was going to increase as the country's cereal deficit grew. In Table 1, assuming that fertility remains constant, the demand for cereal imports would rise from 123,000 in 1985 to 329,000 tons in 2015. This represents a rise of 80 per cent. Even if population growth declines rapidly, cereal imports would rise by 22 per cent from 1985 to 2015. Thus, Botswana could not realistically plan to attain food self-sufficiency (World Bank 1989:17). Additionally, the cost of producing grain in Botswana is much higher than the cost of importing it. As a matter of fact, the cost of producing sorghum and maize between 1985 and 1988 was estimated at twice that of importation. Given these circumstances, the government found it prudent to shift policy from self-sufficiency to food security.

Table 1: Growth in Demand for Grains in Botswana

Population	Projected Grain Consumption ('000 Metric Tons)*			Projected Cereals Deficit ('000 Metric Tons)		
Constant Fertility	203	2000	568	183	170	329
Moderate Decline	203	323	432	183	159	193
Rapid Decline	203	299	382	183	135	143
Projected Grain Production	20**	164	239			

Source: World Bank (1989:16)

*Based on 180 kg grain per capita

**Actual production in 1986; 1985 data was not available.

The National Development Plan (NDP) 7 indicates that the policy of food security has three (3) components;

1) Recognising Botswana's comparative advantage in terms of foreign exchange earnings from livestock, mineral production, sorghum and some other manufactured goods and services. It was envisaged that the foreign exchange so earned can be used to import essential food items such as maize which cannot be competitively produced.

2) Recognising that food consumption mostly occurs at the household level which therefore must have the ability to purchase the necessary food items. It was projected that each household should have sufficient income-generating opportunities and access to food to meet its nutrition requirements.

3) Recognising the need to lessen risk and reduce dependency on food matters, the state decided to institute a strategic grain reserve. The food security policy, in addition, strongly emphasises the diversification of income sources to enable individuals or households to have access to food and other basic needs (Sigwele 1993).

Programmes

Due to persistent drought and experience gained, Botswana though not renowned for her agricultural performances, has been highly acclaimed for her drought relief programmes, especially between 1981 and 1987, the worst drought period in her history. President Quett Masire was the co-winner of the 'Africa Prize for Leadership for the Sustainable End of Hunger'. The Drought Relief Programme, together with the related nutritional surveillance and early warning systems are designed to ensure that adequate food supplies are available throughout the country (Moma 1989). The objectives of the drought relief programme are to alleviate the immediate problems of hunger and malnutrition and to facilitate continuous cultivation of certain level of land and supply of agricultural inputs (Moma 1989). The core of drought relief includes the following programmes:

Supplementary Feeding Programmes

These were intended as a preventive measure to reduce malnutrition among groups considered vulnerable. Since independence, the government has, as a policy, provided supplements to primary school children, children under five on medical grounds, pregnant and lactating mothers, tuberculoses patients and destitutes. However, this was expanded in 1982 in response to the drought and as a means of assisting vulnerable groups. A significant element of the supplementary feeding programme was the inclusion of the Remote Area Dwellers (RADS) most of whom were from the Botswana ethnic group (Fako and Molamu 1995).

In response to drought, the government has expanded this programme to reach all vulnerable groups in rural areas to cover all under-fives, school feeding and food for pregnant and lactating women. There are facilities for direct feeding and rehabilitation of the malnourished at health facilities and designated sites in remote areas.

Direct Feeding Programme

This is aimed at assisting in improving the nutritional status of children with less than 80 per cent weight-for-age; and those consisting of less than 60 per cent weight-for-age. Through these and other programmes, there was a remarkable decline in the percentage of malnourished children from about 30 per cent in 1982 to about 15 per cent in 1986. Thus, the prevailing drought conditions led to improved nutritional status due to government drought relief programmes through which large quantities of food are distributed throughout the country. Health status also have improved considerably since health facilities are available at distribution points. This has helped to facilitate an increase in immunisation, nutritional assessment, health education and growth monitoring (Fako and Molamu 1995).

Fako and Molamu (1995:5) concluded that:

> Paradoxically, the increasingly disadvantageous socio-economic and environmental conditions that prevailed during the drought years were associated with improvement in nutrition, positive national health statistics and general upliftment of the welfare of many communities.

> This unnatural situation, however, is likely to mask rates of absolute poverty and potential future misery.

Labour-Based Drought Relief Programme

These provide about 600,000 jobs in rural areas and make up for jobs lost as a result of the drought, and include:

a) The Arable Lands Development Programme (ALDEP) was designed to increase agricultural production and distribution while tackling the need for employment and income creation among householders, especially in rural areas. ALDEP, according to NDP 5, was:

> To increase production and achieve self-sufficiency in basic grains and legumes at rural household and national level plus export surplus for these and other cash crops in all but the poorest rainfall areas; in so doing raise arable incomes (both self-employed and waged) through improved agricultural productivity and to optimise income distribution effects by concentrating on small-holder development; and to create employment in the land areas to absorb underemployment and reduce rural-urban drift (quoted in Mufune 1995:25-26).

ALDEP was aimed at promoting arable agriculture, especially among those who had not benefited form TGLP. Available data indicate that three (3) events led to the birth of ALDEP: The fact that economic growth did not lead to any significant reductions in unemployment, especially among school leavers and those engaged in small scale agriculture; the realisation that despite the fact that more than 80 per cent of rural dwellers engaged in agriculture, production was still inadequate thus, leading to the importation of food from South Africa. This added to the situation of food insecurity; and the fact that major emphasis was shifting to the development of small scale holder agriculture, especially by donors such as the World Bank. These factors, together with the evidence from official studies indicating growing poverty among small scale farmers, persuaded the government to embark on the policy (Mufune 1995).

ALDEP targeted three groups of farmers: Those with no drought power; those with 1 to 20 heads of cattle; and those with 20 to 40 heads of cattle. The first group was to have access to a package in which 6,000 heads of cattle were to be distributed. There were also 5,400 planter/cultivators, 2,000 ploughs, 4,300 water tanks and 2,100 fences for

distribution to participants. These were to be supported by strengthening marketing and input supplies; improved farm machinery supply and services; and improved extension service, land recording and feeder roads (Mufune 1995; Chipasula and Miti 1989). ALDEP was to complete the land privatisation and leasehold tenure begun under the Tribal Grazing Land Policy (TGLP), by extending it to small scale farmers. Leasehold titles were to extend beyond cattle farmers to include arable farmers who would be helped to fence their land (Mufune 1995).

b) The Accelerated Rain-Fed Arable Programme (ARAP). Under this scheme, 'farmers were paid to plough more land, destump it, plant in rows, and weed' (Morna 1989:3).

The immediate benefits of the above programmes (combined with others), are evident. For example, the infant mortality rate in Botswana has declined to 72 per 1,000 making it the lowest in sub-Saharan Africa. However, there is a general concern about their overall impact on agricultural production, and over the extent to which they are sustainable in the long run.

c) The Tribal Grazing Land Policy (TGLP) was aimed at stopping widespread overgrazing through the creation of commercial leasehold ranches for those with large livestock numbers; increasing cattle productivity through improved range and livestock management (padlocking, rotational grazing, selective breeding, etc.) and to promote social equity. Commercial leasehold ranches were supposed to leave room for smaller farmers to expand; and upgrading rural quality of life by improving incomes from the sale of cattle. Based on these, land was partitioned into commercial and communal areas (Mufune 1995).

Available historical evidence suggests that in colonial times, indigenous people were alienated from their lands in Gaborone, Lobatse and the Tuli Blocks. This led to environmental degradation and large scale migration (Mudzinganyana 1983). However, the real effects of land degradation came to head with the TGLP which encouraged and enabled people to move to frontier areas in a premature manner, and at a rapid rate (Mufune 1995; Thiesenhausen 1991). According to Ringrose and Matheson (1986), the opening up of the supposed unused land for commercial ranching led

to larger than normal increase in human and livestock population in the agricultural heartland of Botswana. This compounded management-linked degradation of pasture resources such as expanded overgrazing and rangeland degradation (Mufune 1995; Cooke 1983; Government of Botswana 1990).

The major problems relate to the fact that programmes have been administrated hurriedly without regard to their long-term sustainability, inadequate orientation of farmers to the proper use and maintenance of equipment; that a programme like ARAP actually paid farmers to do normal agricultural chores, and 'to use old methods in an increasing area of land', and turning agricultural demonstrators into administrators instead of field workers. In addition, in many instances, farmer groups' activities have been turned into gatherings to receive government handouts as opposed to fora for problem resolution (Morna 1989:32).

In financial terms, these programmes have been very expansive. For example, the Ministry of Agriculture estimated that P29,210,000 would be spent on ARAP in the years 1986-87 to 1989-90. However, the Ministry spent P29,907,992.95 on ARAP in 1987-88 alone (UNICEF 1989). These programmes are managed by various government ministries and agencies. The Ministry of Agriculture is involved in managing ARAP, ALDEP and TGLP. FAP is managed by the Ministry of Commerce and Industry. Drought Relief involves the Office of the Vice-President, Ministry of Finance and Development Planning, National Food Strategy Monitoring Group, Rural Development Councils, Inter-Ministerial Drought Committee, Early Warning Technical Committee, and District Drought Committees.

Conclusion

What is clear from this discussion is that an increase in food self-sufficiency is desirable however, that there is need to raise the levels of local food production since agriculture still provides the biggest number of jobs and many Botswana have few cattle despite the emphasis on the cattle industry. Despite the harsh environmental factors and the numerous programmes, the agricultural sector could be made more productive than is currently the situation (Morna 1989). There is also emphasis on diversification which is a major objective in the National Development

Plan (NDP 8). It is evident that the environment is a major factor in the design and execution of social policies.

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